APPENDIX A—BEST MANAGEMENT PRACTICES FOR LAND USES

Best management practices (BMP) are those land and resource management techniques determined to be the most effective and practical means of maximizing beneficial results and minimizing conflicts and negative environmental impacts from management actions. BMPs can include structural and nonstructural controls, specific operations, and maintenance procedures. BMPs can be applied before, during, and after activities to reduce or eliminate negative environmental impacts. BMPs are not one-size-fits-all solutions. BMPs should be selected and adapted through interdisciplinary analysis to determine which management practices are necessary to meet the goals and objectives of the Resource Management Plan (RMP). The best practices and mitigation measures for a particular site are evaluated through the site-specific National Environmental Policy Act process and vary to accommodate unique, site-specific conditions and local resource conditions.

BMPs described in this appendix are designed to assist in achieving RMP goals and objectives. These BMPs could apply, where appropriate, to all use authorizations, including projects initiated by the Bureau of Land Management (BLM). BMPs are dynamic and should not be interpreted as specific direction at the same level as RMP decisions. BMPs are selected and implemented as necessary, based on site-specific conditions, to meet resource objectives for specific management actions.

This appendix does not provide an exhaustive list of BMPs. Additional BMPs may be identified during an interdisciplinary process when evaluating site-specific management actions. Implementation and effectiveness of BMPs need to be monitored to determine whether they are achieving RMP goals and objectives. Adjustments to BMPs can be made as necessary to ensure that RMP goals and objectives are being met as well as to conform to changes in BLM regulations, policy, and direction or new scientific information. In addition, project proponents can suggest alternate conditions that could accomplish the same result.

Because the management of environmental impacts is an ongoing process, continual refinement of BMP design is necessary. This process can be described in these five steps: (1) selection of the design of a specific BMP, (2) application of the BMP, (3) monitoring, (4) evaluation, and (5) feedback. Data gathered through monitoring is evaluated and used to identify changes needed in BMP design and application or in the monitoring program.

BMPs have been developed and used by numerous energy companies and state and federal agencies throughout the nation. Development and sharing of BMPs represents a commitment to the idea that smart planning and responsible follow-through manage and, in some cases, reduce impacts to resources, both now and in the future. BMPs developed by other agencies should be considered in addition to those identified in this document. Some of these other BMPs are contained in the following documents and websites:

- *Utah's Forest Water Quality Guidelines: A Practical User's Guide for Landowners, Loggers, and Resource Managers* (State of Utah, Department of Natural Resources, Division of Forestry, Fire and State Lands). As of November 2006, an electronic version of this document was available at http://extension.usu.edu/forestry/Management/UtFWQGuide/Assets/PDFDocs/UFWQGBOO.pdf.
- *Coalbed Methane Best Management Practices: A Handbook – 2006 Update* (Western Governors' Association). As of November 2006, an electronic version of this document was available at www.westgov.org/wga/initiatives/coalbed.

- *Low-Volume Roads Engineering Best Management Practices Field Guide* (U.S. Forest Service). As of November 2006, an electronic version of this document was available at www.blm.gov/bmp/field%20guide.htm.
- *Water-Road Interaction Technology Series Documents* (U.S. Forest Service). As of November 2006, electronic versions of these documents were available at www.stream.fs.fed.us/water-road.
- *National Menu of Stormwater Best Management Practices* (U.S. Environmental Protection Agency). As of November 2006, electronic versions of these documents were available at http://cfpub.epa.gov/npdes/stormwater/menuofbmps/con_site.cfm.
- *Technical Information Sheets: Specific and Detailed BMP Guidance* (Bureau of Land Management). As of November 2006, an electronic version of this document was available through hyperlinks located at www.blm.gov/bmp/Technical_Information.htm.
- *WO IM 2007-021 Integration of Best Management Practices into Applications for Permit to Drill Approvals and Associated Rights of Way*. This document establishes formal BLM policy on the inclusion and use of BMPs with energy development. As of November 2006, an electronic version of this document was available at http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices.html.
- *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development: The Gold Book* (BLM). As of November 2006, an electronic version of this document was available through hyperlinks located at www.blm.gov/bmp/Technical_Information.htm.

In addition, this appendix contains conservation measures identified jointly by the BLM and the U.S. Fish and Wildlife Service (USFWS) as needed to protect specific threatened or endangered species. These conservation measures are targeted to specific species and must be considered and applied as appropriate.

POTENTIAL BEST MANAGEMENT PRACTICES

Surface Disturbing Activities

- Areas subject to surface disturbance should be evaluated for the presence of cultural resources or values. This is usually accomplished through the completion of a cultural clearance. An on-the-ground inspection by a qualified archeologist, historian, or paleontologist is required. In cases where cultural resources are found, the preferred response would be to modify the proposed action to avoid the cultural resource (avoidance). If avoidance is not possible, actions would be taken to preserve the data or value represented by the cultural resource (mitigation).
- Areas subject to surface disturbance would be evaluated for the presence of threatened, endangered, or candidate animal or plant species. This is usually accomplished through the completion of a biological clearance. An on-the-ground inspection by a qualified biologist is required. In cases where threatened, endangered, or candidate species is affected, the preferred response would be to modify the proposed action to avoid the species or its habitat (avoidance). If avoidance of a threatened, endangered, or candidate species or its habitat is not possible, a Section 7 consultation with USFWS would be required and a biological assessment would be prepared to recommend actions to protect the species or its habitat.
- Special design and reclamation measures may be required to protect scenic and natural landscape values. These measures may include transplanting trees and shrubs, mulching and fertilizing disturbed areas, using low-profile permanent facilities, and painting to minimize visual contrasts. Surface disturbing activities may be moved to avoid sensitive areas or to reduce the visual effects of the activities.
- Aboveground facilities requiring painting should be designed to blend in with the surrounding environment.

- Reclamation should be implemented concurrently with construction and site operations to the fullest extent possible. Final reclamation actions should be initiated within 6 months of the termination of operations unless otherwise approved in writing by the authorized officer.
- Fill material should be pushed into cut areas and up over back slopes. Depressions should not be left that would trap water or form ponds.

Mineral Exploration and Development

- Reduce impacts to wildlife and visual resources by applying the following, as appropriate:
  - Directional drilling of oil and gas wells
  - Drilling of multiple wells from a single pad
  - Closed drilling systems
  - Cluster development
  - Belowground wellheads
  - Remote well monitoring
  - Piping of produced liquids to centralized tank batteries offsite to reduce traffic to individual wells
  - Transportation planning (i.e., to reduce road density and traffic volumes)
  - Compensation mitigation
  - Noise reduction techniques and designs
  - Installation of raptor anti-perch devices in Greater sage-grouse habitat
  - Monitoring of wildlife populations during drilling operations
  - Avoidance of human activity between 8:00 p.m. and 8 a.m. from March 1 through May 15 within one-quarter mile of the perimeter of occupied sage-grouse leks
  - Onsite bioremediation of oil field waste and spills
  - Removal of trash, junk, waste, and other materials not in current use
- Reclaim all disturbed surface areas promptly, performing concurrent reclamation as necessary, and minimize the total amount of surface disturbance.
- Strip all surface soil prior to conducting operations, stockpiling, and reapplying during reclamation, regardless of soil quality. Minimize the length of time soil remains in stockpiles and the depth or thickness of stockpiles.
- Strip and separate soil surface horizons where feasible and reapply in proper sequence during reclamation.
- Establish vegetation cover on soil stockpiles that are to be in place longer than 1 year.
- Construct and rehabilitate temporary roads, consistent with intended use, to minimize total surface disturbance.
- Consider temporary measures such as silt fences, straw bales, and mulching to trap sediment in sensitive areas until reclaimed areas are stabilized with vegetation.
- Bury distribution powerlines and/or flow lines in or adjacent to access roads.
- Perform interim reclamation of well locations and access roads after wells are put into production.
- Reshape all areas to be permanently reclaimed to the approximate original contour, providing for proper surface drainage.

Road Design and Maintenance

- Keep access roads to a minimum, using them only when necessary.
- Design roads to minimize total disturbance, to conform to topography, and to minimize disruption of natural drainage patterns.
- Locate roads on stable terrain (such as ridgetops, natural benches, and flatter transitional slopes near ridges and valley bottoms and moderate sideslopes) and away from slumps, slide-prone areas,

concave slopes, clay beds, and where rock layers are parallel to the slope. Locate roads on well-drained soil types; avoid wet areas.

- Construct roads for surface drainage by using outslopes, crowns, grade changes, drain dips, waterbars, and/or insloping to ditches as appropriate. Maintain drain dips, waterbars, road crowns, insloping, and outsloping, as appropriate, during road maintenance. Grade roads only as necessary.
- Slope the road base to the outside edge for surface drainage for local spurs or minor collector roads where low-volume traffic and lower traffic speeds are anticipated. This also is recommended in situations where long intervals between maintenance will occur and where minimum excavation is wanted. Outsloping is not recommended on steep slopes. Sloping the road base to the inside edge is an acceptable practice on roads with steep sideslopes and where the underlying soil formation is very rocky and not subject to appreciable erosion or failure.
- Construct arterial and collector roads with crown and ditching where traffic volume, speed, and intensity and user comfort are considerations. Recommended gradients range from 0 to 15 percent where crown and ditching may be applied, as long as adequate drainage away from the road surface and ditch lines is maintained.
- Construct roads when soils are dry and not frozen, if possible, in soil types with a low sand component. When these types of soils or road surfaces become saturated to a depth of 3 inches, BLM-authorized activities should be limited or cease unless otherwise approved by the authorized officer.
- Retain vegetation between roads and streams to filter runoff caused by roads.
- Use culverts that pass, at a minimum, a 50-year storm event and/or have a minimum diameter of 24 inches for permanent stream crossings and a minimum diameter of 18 inches for road crossdrains.
- Strip and stockpile topsoil ahead of construction of new roads if feasible. Reapply soil to cuts and fillslopes prior to revegetation.
- Utilize existing roads whenever possible instead of constructing new roads.

Rights-of-Way and Utility Corridors

- Rights-of-way and utility corridors should use areas adjoining or adjacent to previously disturbed areas whenever possible.
- Disturbed areas within road rights-of-way and utility corridors should be stabilized by vegetation practices designed to hold soil in place and minimize erosion. Vegetation cover should be reestablished to increase infiltration and provide additional protection from erosion.
- Sediment barriers should be constructed when needed to slow runoff, allow deposition of sediment, and prevent transport from the site. Straining or filtration mechanisms also may be employed for the removal of sediment from runoff.

Noxious Weed Management

- To reduce the potential for the introduction of noxious weeds, all equipment should be cleaned off, by pressure washing, prior to operating on BLM lands. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts is required.
- All seed, hay, straw, mulch, and other vegetation material transported and used on public land weed-free zones for site stability, rehabilitation, or project facilitation should be certified by a qualified federal, state, or county officer as free of noxious weeds and noxious weed seed.

Reducing Impacts to Visual Resource Management Class II and Class III Areas

- Bury distribution powerlines and flow lines in or adjacent to access roads.

- Repeat form, line, color, and texture elements to blend facilities with the surrounding landscape.
- Paint all aboveground structures not requiring safety coloration an environmental color that is two shades darker than the surrounding environment.
- Perform final reclamation recontouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography.
- Avoid facility placement on steep slopes, ridgetops, and hilltops.
- Reclaim unused well pads within 1 year.

Developed Recreation Sites

- Construct recreation sites and provide appropriate sanitation facilities to minimize impacts to resource values and public health and safety and to minimize user conflicts of approved activities and access within an area as appropriate.
- Use public education and/or physical barriers (such as rocks, posts, and vegetation) to direct or preclude uses and to minimize impacts to resource values.

Riparian/Wetland Areas

- Avoid locating roads, trails, and landings in wetlands.
- Locate, identify, and mark riparian management areas during the design of projects that may cause adverse impacts to riparian management areas.
- Keep open water free from slash.
- Avoid equipment operation in areas of open water, seeps, and springs.
- Utilize low-ground-pressure equipment (floatation tires or tracks) as necessary to minimize rutting and compaction.

Water Developments

- Work in springs and stream beds should be done by hand where possible. If machinery is needed in these areas, select equipment that minimizes disturbance.
- After construction of spring head boxes, troughs, pipelines, and well sites, the areas should be cleaned up and refuse removed.
- Cuts, fills, and excavations should be dressed and seeded to blend with surroundings. Pipelines should be buried where possible.
- Original water sources should be protected, and fenced if required, and an offstream watering supply should be provided near the site.
- The size of storage tanks and troughs should accommodate the expected needs of livestock and wildlife using them.
- Water should be left at the site for wildlife. Wells should be cased to prevent cave-ins, and well sites should be fenced.
- Storage structures should be designed to provide water for wildlife. Drinking ramps should be installed, and their heights should not prohibit young wildlife from obtaining water.

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